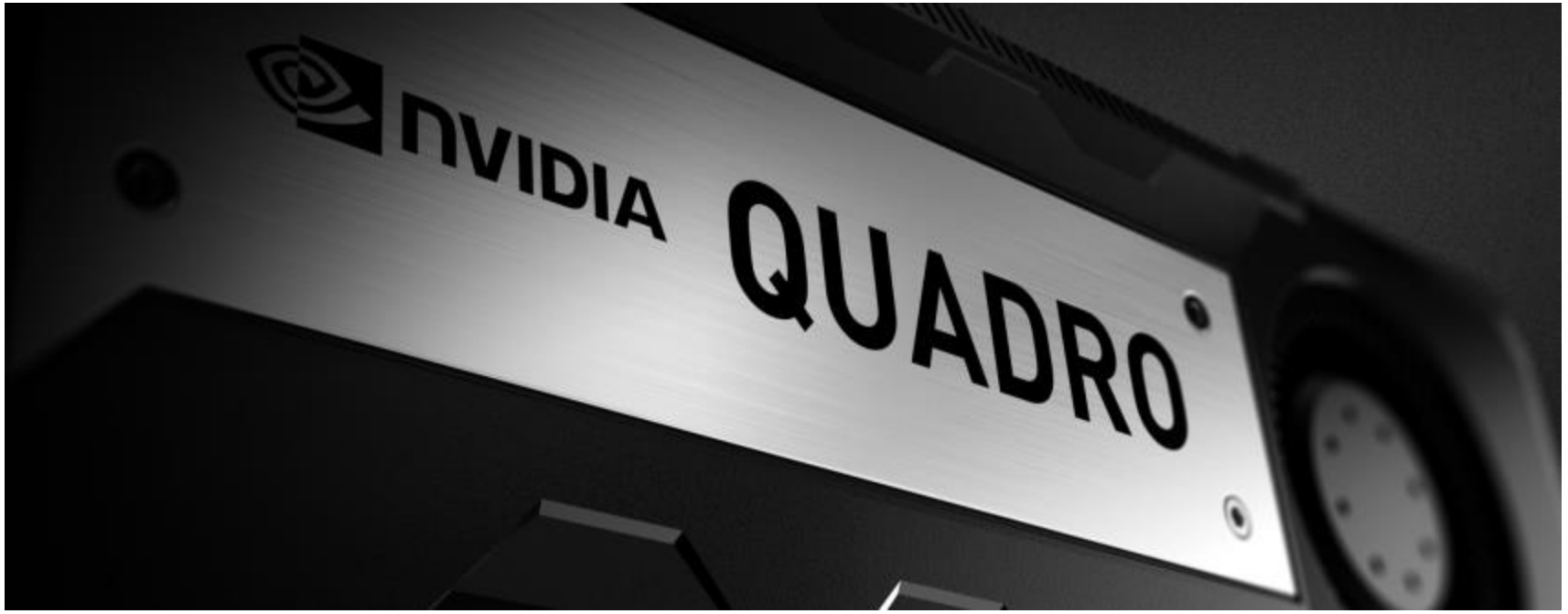


PNY Professional Solutions

NVIDIA GRID - GPU Acceleration for the Cloud

GRID
PARALLEL COMPUTING

QUADRO
ADVANCED VISUALIZATION

TESLA
PARALLEL COMPUTING

PREVAIL & PREVAIL ELITE SSDs
PROFESSIONAL STORAGE

NVS
COMMERCIAL GRAPHICS

Professional Solutions

NVIDIA® QUADRO®
AUTHORIZED PARTNER
PNY®

#1 Brand of Professional Graphics Solutions

- **~ 75% Market Share**

Powering the most advanced solutions in the world

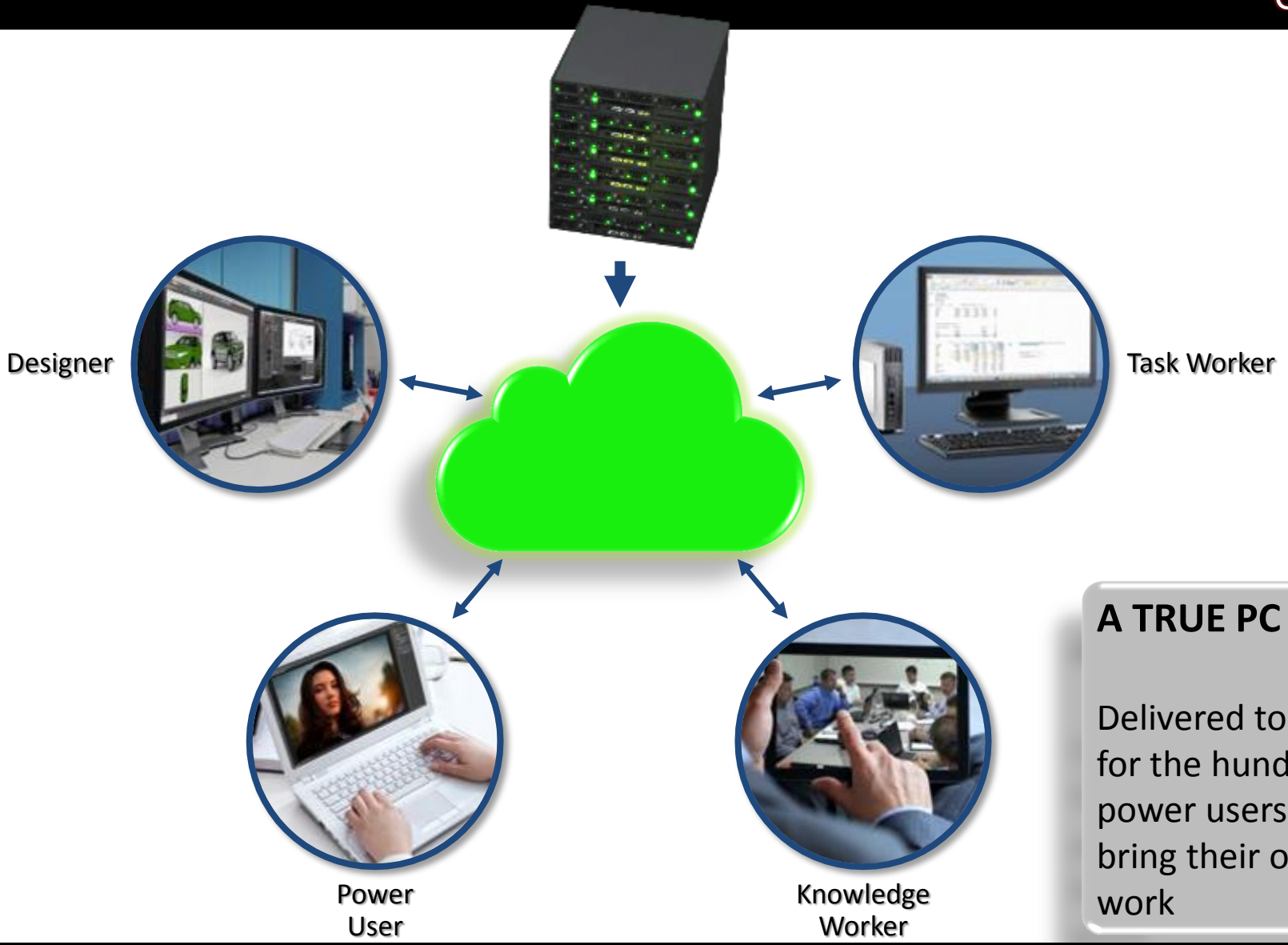
- Visualization Centers – Boeing, Porsche, Peugeot, BMW
- Medical Imaging – Mass General
- Scientific Computing – Los Alamos, Sandia
- Digital Film Production – Disney, ILM, Dreamworks
- HD Broadcast Graphics – ESPN, CNBC, CNN

Engineered for performance and quality

- Certified on all leading professional applications

1	3 year warranty
2	Pre-sales support and configuration assistance
3	Support for all workstation brands and complex installations
4	Advanced replacement for mission-critical deployments
5	Dedicated Quadro Field Application Engineers
6	Support escalation for prompt issue resolution
7	Certified software support and bug reporting
8	Published product support and training materials


Task Worker



A TRUE PC EXPERIENCE

Delivered to any device for the hundreds of millions of power users who want to bring their own devices to work

VDI
POWERED BY
NVIDIA GRID™

VIRTUAL MACHINE

Windows 7

Apps

NVIDIA GRID Enabled
Virtual Desktop

NVIDIA Driver

NVIDIA GRID ENABLED
Hypervisor

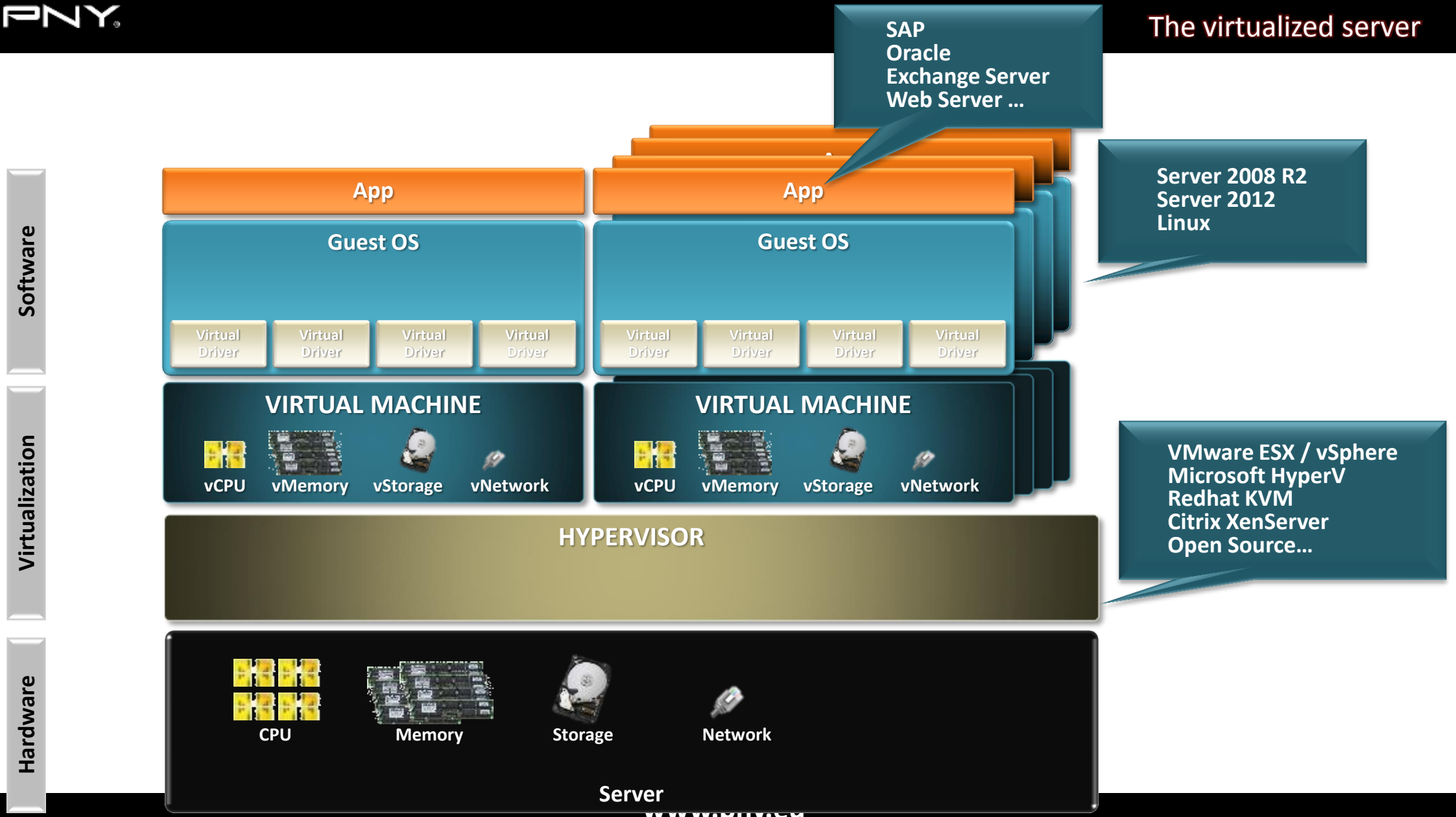
NVIDIA GRID GPU

VIRTUAL DESKTOPS

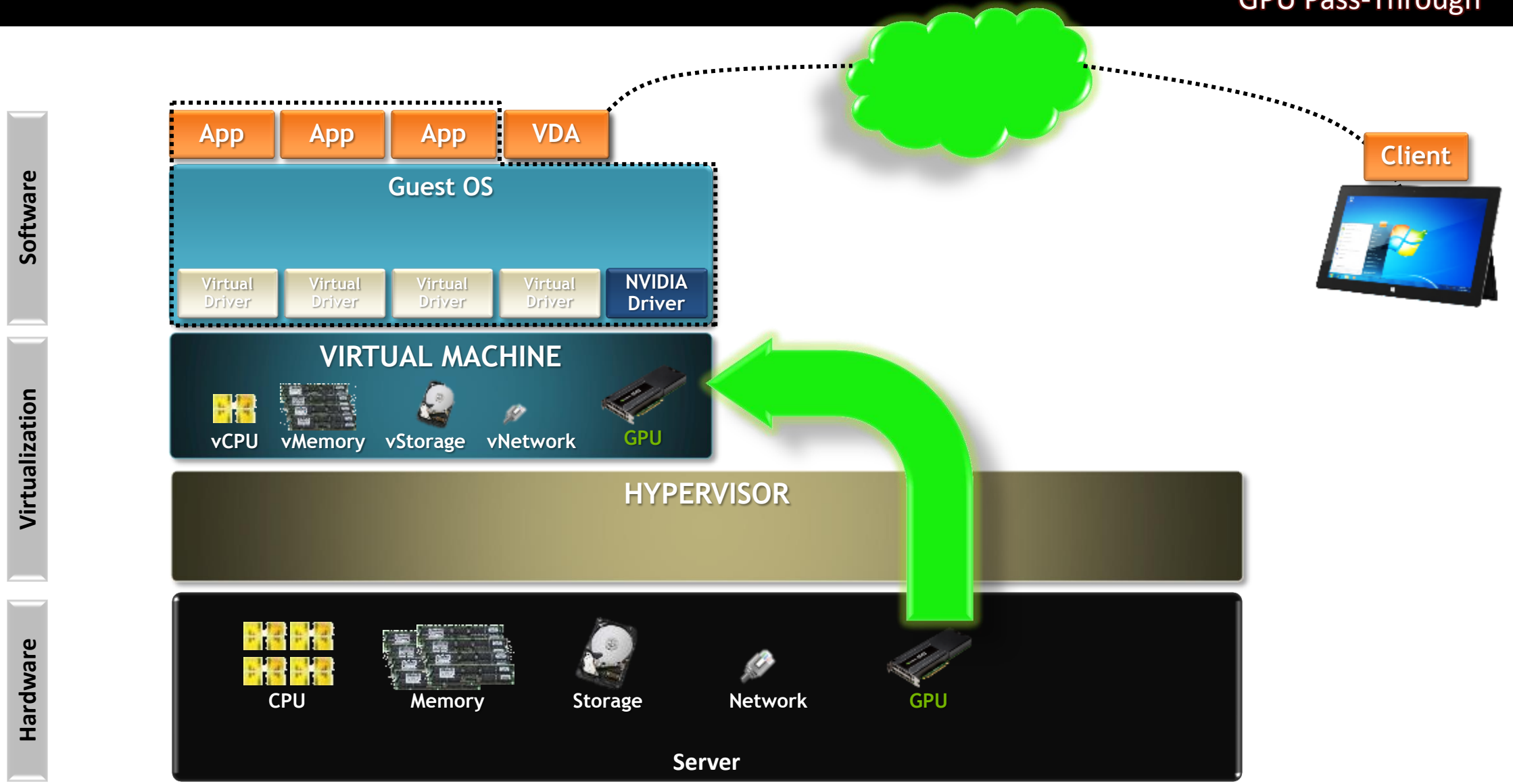
	NVIDIA GRID K1	NVIDIA GRID K2
		
GPU	4 Kepler GPUs	2 High End Kepler GPUs
CUDA cores	768 (192 / GPU)	3072 (1536 / GPU)
Memory Size	16GB DDR3 (4GB / GPU)	8GB GDDR5 (4GB / GPU)
Max Power	130 W	225 W
Form Factor	Dual Slot ATX, 10.5”	Dual Slot ATX, 10.5”
Display IO	None	None
Aux power requirement	6-pin connector	8-pin connector
PCIe	x16	x16
PCIe Generation	Gen3 (Gen2 compatible)	Gen3 (Gen2 compatible)
Cooling solution	Passive	Passive
# users	4 - 100[1]	2 – 64[1]
OpenGL	4.3	4.3
Microsoft DirectX	11	11
VGX Hypervisor support	Yes	Yes

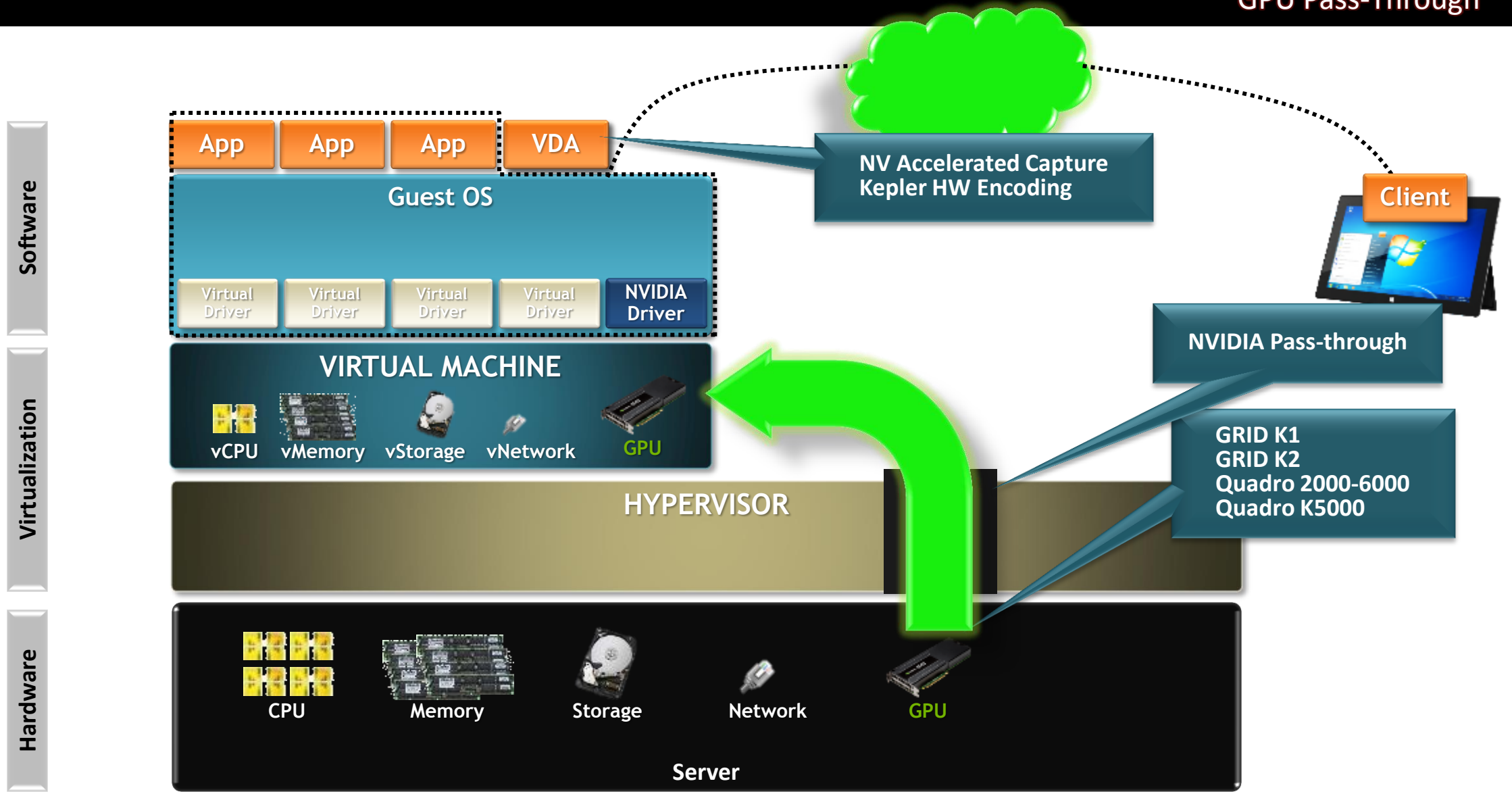
[1] Number of users depends on software solution, workload, and screen resolution

The virtualized server



- **GPU pass-through** 1:1 dedicated GPU to user
- **Shared GPU** *Software* virtualization of the GPU
- **VGX** *Hardware* virtualization of the GPU through the NVIDIA VGX Hypervisor


Software
Virtualization
Hardware
App
App
App
VDA
Guest OS
Virtual Driver
Virtual Driver
Virtual Driver
Virtual Driver
NVIDIA Driver
VIRTUAL MACHINE
vCPU
vMemory
vStorage
vNetwork
GPU
HYPERVISOR
CPU
Memory
Storage
Network
GPU
Server
Client


Software
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Virtual Driver
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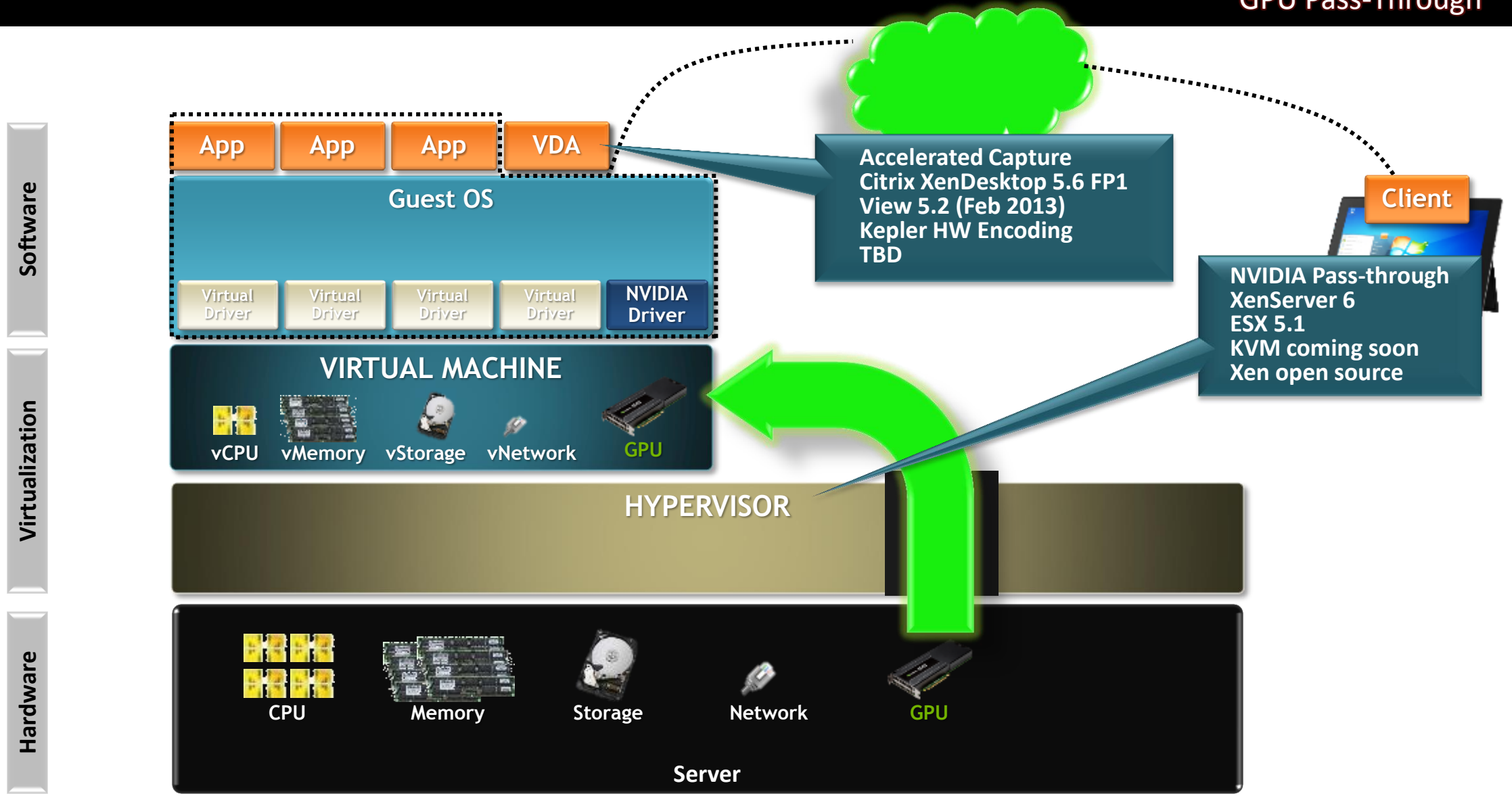
Virtual Driver
NVIDIA Driver
VIRTUAL MACHINE
vCPU
vMemory
vStorage
vNetwork
GPU
HYPERVISOR
CPU
Memory
Storage
Network
GPU
Server
NV Accelerated Capture
Kepler HW Encoding
Client
NVIDIA Pass-through
GRID K1
GRID K2
Quadro 2000-6000
Quadro K5000


Software
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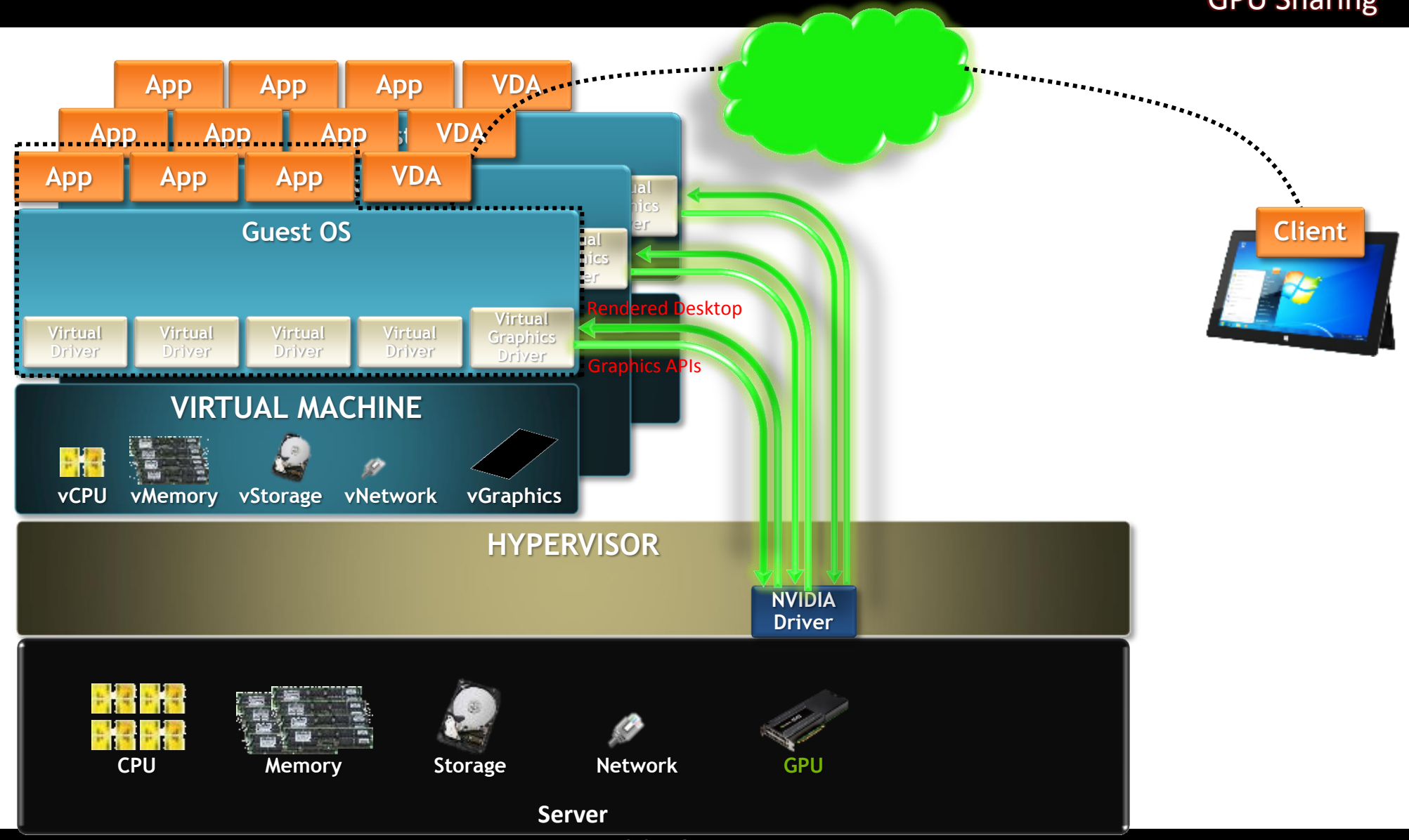
NVIDIA Driver
VIRTUAL MACHINE
vCPU
vMemory
vStorage
vNetwork
GPU
HYPERVISOR
CPU
Memory
Storage
Network
GPU
Server
Accelerated Capture
Citrix XenDesktop 5.6 FP1
View 5.2 (Feb 2013)
Kepler HW Encoding
TBD
Client
NVIDIA Pass-through
XenServer 6
ESX 5.1
KVM coming soon
Xen open source

Also known as

- Software Virtualization
- API intercept


Software
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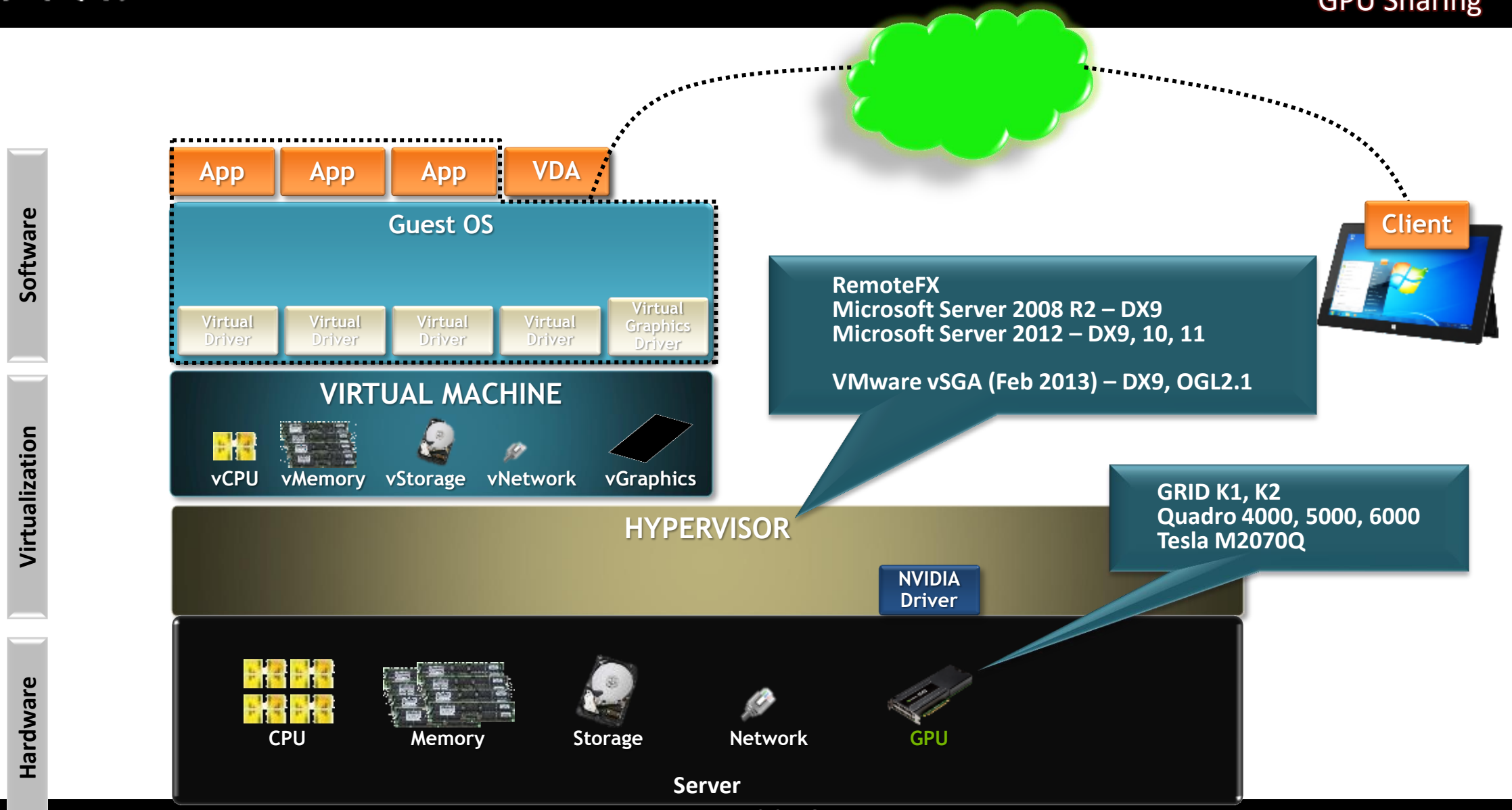
VDA
Guest OS
Virtual Driver
Virtual Driver
Virtual Driver
Virtual Driver
Virtual Graphics Driver
Rendered Desktop
Graphics APIs
VIRTUAL MACHINE
vCPU
vMemory
vStorage
vNetwork
vGraphics
HYPERVISOR
NVIDIA Driver
CPU
Memory
Storage
Network
GPU
Server
Client


Software
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Virtual Graphics Driver
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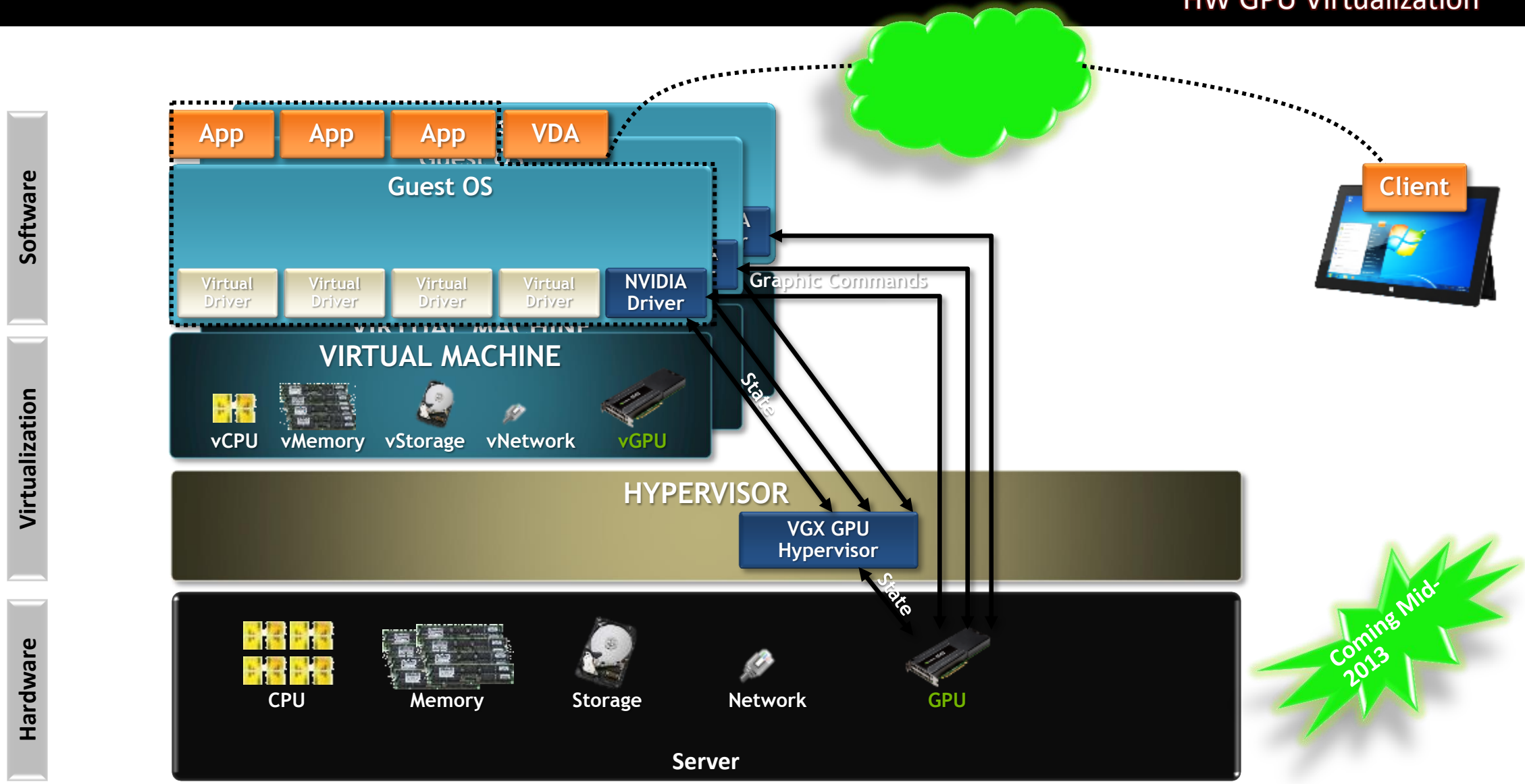
vCPU
vMemory
vStorage
vNetwork
vGraphics
HYPERVISOR
NVIDIA Driver
CPU
Memory
Storage
Network
GPU
Server
Client
RemoteFX
Microsoft Server 2008 R2 – DX9
Microsoft Server 2012 – DX9, 10, 11
VMware vSGA (Feb 2013) – DX9, OGL2.1
GRID K1, K2
Quadro 4000, 5000, 6000
Tesla M2070Q

Also known as

- Hardware Virtualization
- vGPU or Virtual GPU
- VGX GPU Hypervisor


Software
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Virtual Driver
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NVIDIA Driver
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vStorage
vNetwork
vGPU
Graphic Commands
State
HYPERVISOR
VGX GPU Hypervisor
State
CPU
Memory
Storage
Network
GPU
Server
Client
Coming Mid-2013

Software

Virtualization

Hardware

App App App VDA

Guest OS

Virtual Driver | Virtual Driver | Virtual Driver | Virtual Driver | NVIDIA Driver

Standard NVIDIA Driver

Client

Citrix XenServer

VIRTUAL MACHINE

vCPU vMemory vStorage vNetwork vGPU

NVIDIA VGX Hypervisor from NVIDIA

HYPERVISOR

VGX GPU Hypervisor

GRID K1, K2

CPU Memory Storage Network GPU

Server

Coming Mid-2013

GRID ENABLED SOLUTIONS ROADMAP

GRID Enabled Roadmap for Citrix XenDesktop

Virtual Workstation

VDI

Today

Citrix HDX 3D Pro

XenDesktop 5.6 FP1

XenServer 6

GPU Dedicated per user

Under Development
Target 2nd half 2013

Dedicated GPU

HARDWARE VIRTUALIZATION

Citrix HDX 3D Pro
+
VGX Hypervisor

XenDesktop [next]

XenServer [next]

Virtualized GPUs for users

Virtual Workstation

VDI

Today

Under Development
Target 2nd half 2013

App Virtualization (Sessions)

Citrix HDX 3D

XenApp 6.5
Windows Server

GPU sharing for DirectX

Citrix HDX 3D

XenApp 6.5 add-on
Windows Server

GPU sharing for OpenGL & DirectX

GRID Enabled Solutions Roadmap for VMware

Virtual Workstation

VDI

Q1 2013

VMware vDGA

View 5.2
ESX 5.1

Dedicated GPU

Citrix HDX 3D Pro
+
VMware Hypervisor

XenDesktop 5.6 FP1
ESX 5.1

VMware vSGA

View 5.2
ESX 5.1

Software Virtualization

Virtual Workstation

VDI

Available Now

Microsoft RemoteFX

Server 2008 R2
DirectX 9

Software Virtualization

Microsoft RemoteFX

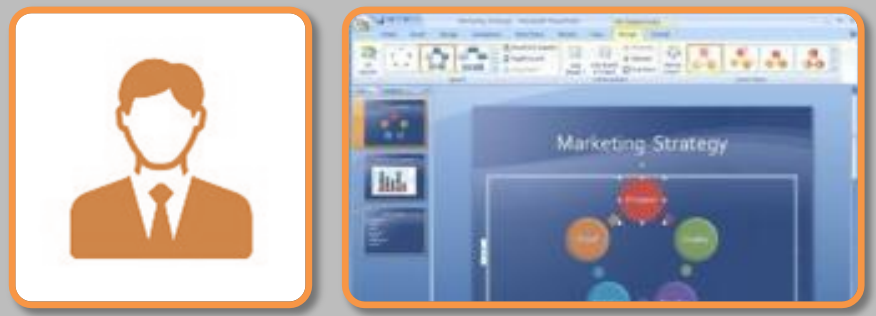
Server 2012
DirectX 9, 10, 11

VIRTUAL REMOTE
WORKSTATION

DESIGNER
CATIA, CS6, Inventor

VIRTUAL DESKTOP
Virtualized GPU

POWER USER



KNOWLEDGE WORKER

Traditionally a NVIDIA Quadro User

Creates and works with complicated datasets using graphics intensive applications (3D design, medical diagnostics, etc.)

Users here can benefit from the improved experience of a GPU powered desktop for everyday tasks, and IT can benefit with improved user densities.

Related Industries:
Oil & Gas, Manufacturing, Media & Entertainment, Medical Imaging, Public Sector

Application Examples:
Dassault Systèmes (CATIA, SolidWorks, Enovia) Siemens NX, Autodesk (3ds Max, Inventor, Maya) etc.

+ all the same applications that Power User and Knowledge workers use

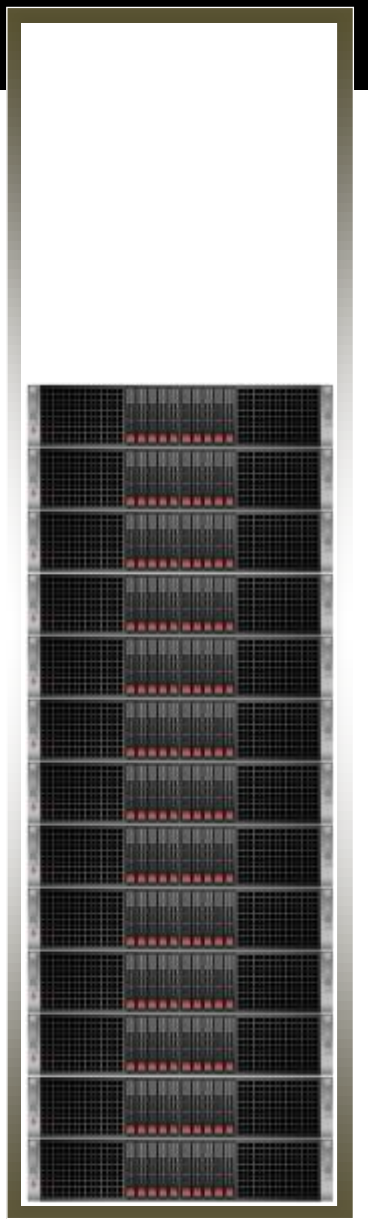
Implementation Details

User	NVIDIA GRID	Hypervisor	Virtual Desktop Agent	Recommended Configuration
Designer	K2	XenServer 6.1	XenDesktop 5.6 FP1 (with HDX 3D Pro)	**4 Users** **2 GRID VGX K2 Boards** Dual socket server 64GB system memory
		or		
		ESXi 5.1 with vDGA	View 5.2 or XenDesktop 5.6 FP1 (with HDX 3D Pro)	

4 User (Dedicated GPU) Virtual Workstation

2 GRID K2 boards (4 NVIDIA High-end GPUs)

- Dual CPU socket 2U server
- 64GB System memory (16GB per user)
- 1100W per 2U



52 Users per Rack

13 Nodes
4 Users per Node
15KW Rack

Connects to NAS

A user of visual data (3D images, and 2D graphs and line charts). Often uses a specialized application beyond the typical Office suite and web tools.

May also be someone who tried VDI without GPU acceleration and was not satisfied.

Related Industries:

Healthcare (nurses' stations, doctors' offices, doctors' tablets), Educational Institutions (target engineering and design schools), Government (simulation and training, Geospatial research), Manufacturing (Product Data Management, Product Lifecycle Management, Manufacturing Floor/Job Site, Support).

Application Examples:

Manufacturing Product Lifecycle applications (SolidWorks View,PTC Creo View and View Express, Autodesk Inventor View, Siemens NX Viewer, Team Center Visualization) , Adobe Imaging applications, medical imaging applications, Microsoft Office PowerPoint users, Authoring, Video editing applications.

Implementation Details

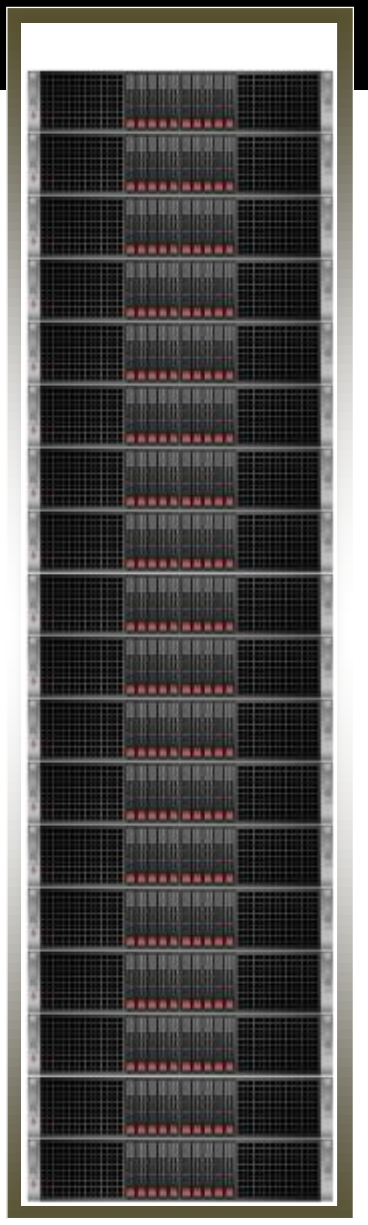
User	NVIDIA GRID	Hypervisor	Virtual Desktop Agent	Recommended Configuration
Power User	K1	XenServer 6.1 → XenDesktop 5.6 FP1 (with HDX 3D Pro) or ESXi 5.1 with vDGA → View 5.2 or XenDesktop 5.6 FP1 (with HDX 3D Pro)		**8 Users** **2 GRID K1 boards** Dual socket server 64 GB system memory

8 User (Dedicated GPU) VDI server

2 GRID K1 boards (8 NVIDIA GPUs)

Dual CPU socket 2U server (32 HT cores)

64GB System memory 800W per 2U



152 Users per Rack

19 Nodes

8 Users per Node

15KW Rack

Connects to NAS

This is typically an office worker who uses office applications, email, video conferencing and rich media internet applications.

Related Industries:
Financial Services (Retail, Commercial and Investment Banking, Insurance), Manufacturing, Life Sciences, Oil & Gas, Media & Entertainment, Telecommunications, Government, Education, Technology.

Application Examples:
Microsoft Office Suite (PowerPoint), Video Conferencing, Rich media web browsing

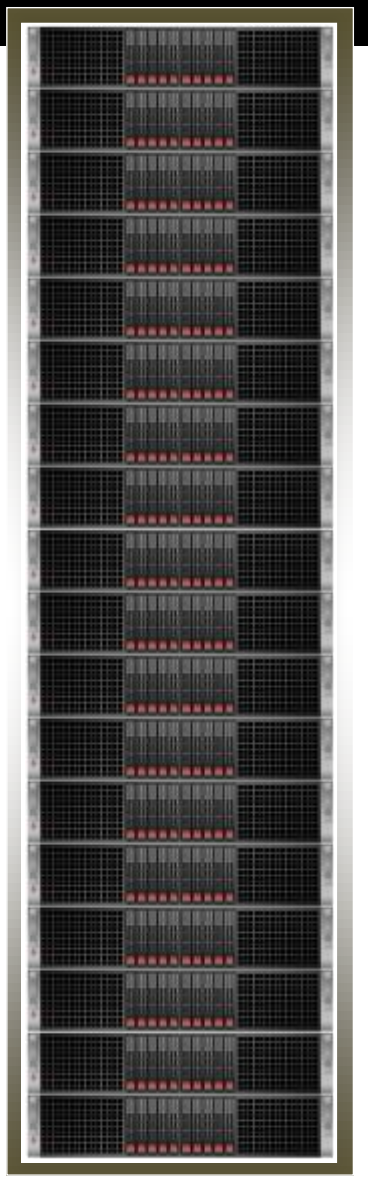
Implementation Details

User	NVIDIA GRID	Hypervisor	Virtual Desktop Agent	Recommended Configuration
Knowledge Worker	K1	XenServer 6.1	XenDesktop 5.6 FP1 (with HDX 3D Pro)	**8-32+ users** **2 GRID K1 Boards**
		or		
		ESXi 5.1 with vSGA	View 5.2	
		or		
		Windows Server 2012 With Hyper-V	Remote FX	Dual socket server Minimum 128GB system memory

8-32+ User (Dedicated or Shared GPU) VDI server

2 GRID K1 boards (8 NVIDIA GPUs)

- Dual CPU socket 2U server
- Minimum 128GB System memory
- 800W per 2U



152 -608+ Users per R

19 Nodes

8-32+ Users per Node

15KW Rack

Connects to NAS

User	NVIDIA GRID	Hypervisor	Virtual Desktop Agent	Recommended Configuration
 Designer	K2	XenServer 6.1	XenDesktop 5.6 FP1 (with HDX 3D Pro)	**4 Users** **2 GRID K2 boards**
		or		
		ESXi 5.1 with vDGA	View 5.2 or XenDesktop 5.6 FP1 (with HDX 3D Pro)	Dual socket server 64 GB system memory
 Power User	K1	XenServer 6.1	XenDesktop 5.6 FP1 (with HDX 3D Pro)	**8 Users** **2 GRID K1 boards**
		or		
		ESXi 5.1 with vDGA	View 5.2 or XenDesktop 5.6 FP1 (with HDX 3D Pro)	Dual socket server 96 GB system memory
 Knowledge Worker	K1	XenServer 6.1	XenDesktop 5.6 FP1 (with HDX 3D Pro)	**8-32+ Users** **2 GRID K1 boards**
		or		
		ESXi 5.1 with vSGA	View 5.2	Dual socket server Minimum 128 GB system memory
		or		
		Windows Server 2012 With Hyper-V	Remote FX	

A Market leader:

In contact with resellers **across EMEA**
Increasing its Sales and Marketing team to deliver the right service to you
Visibility on fairs / trade shows

A strong logistic:

Flexibility
Minimum stocks
Key local distribution partners
48 hrs delivery in Europe

Pre-Sales support:

Technical Support:

3 years support
Multilingual tech support team
Quadro , Tesla & Grid dedicated tech support team
Replacement of the default product

Who:

Hardware and **software** resellers
Value Added Resellers (VAR)
System Integrators (SI)

Benefits:

Regular PNY-brand NVIDIA Quadro® updates through a **Twitter** account which will keep you informed about new products, promos, events…

@pnyprouk **@pnyprode** **@pnyprofr**

Access to technical specifications and sales tools: presentations, brochures, manuals, guides
Marketing materials: pictures, artworks, logos.

Special offers and promotions

You will be automatically registered in our "Where to buy?" Section so your name will appear when an end-user is looking for a Quadro reseller Support

Thank You !